

WHAT IS CLAIMED IS:

1. A method for transmitting signals, comprising:
amplifying an upper layer signal with a first excess bandwidth ratio at a first power level within a frequency band;
5 amplifying a lower layer signal with a second excess bandwidth ratio at a second power level within the frequency band, the second power level being exceeded by the first power level; and
transmitting a layered modulation signal for at least one receiver, the layered modulation signal comprising both the upper layer signal and the lower layer signal
10 interfering with each other within the frequency band such that the upper layer signal can be demodulated directly from the layered modulation signal and the lower layer signal can be demodulated after subtracting the upper layer signal from the layered modulation signal;
wherein substantially no guard band is used within the frequency band.
- 15 2. The method of claim 1, wherein the lower layer signal includes a lower layer code rate, the upper layer signal includes an upper layer code rate.
3. The method of claim 1, wherein at least one of the first excess bandwidth ratio and the second excess bandwidth ratio do not exceed 0.1.
4. The method of claim 1, wherein the upper layer signal comprises a legacy
20 signal in a satellite television system.
5. The method of claim 1, further comprising amplifying a third signal, the third signal having a third excess bandwidth ratio;
wherein transmitting the layered modulation signal includes transmitting the third signal occupying a majority of the frequency band of the layered modulation
25 signal.

6. The method of claim 5, wherein the lower layer signal and the upper layer signal each do not interfere with the third signal.
7. The method of claim 5, wherein the lower layer signal interferes with the third signal.
- 5 8. The method of claim 5, wherein the first excess bandwidth ratio and the second excess bandwidth ratio each do not exceed 0.1 and the third excess bandwidth ratio does not exceed 0.2.
9. A system for transmitting signals, comprising:
a first amplifier for amplifying an upper layer signal with a first excess
10 bandwidth ratio at a first power level within a frequency band;
a second amplifier for amplifying a lower layer signal with a second excess
bandwidth ratio at a second power level within the frequency band, the second power
level being exceeded by the first power level; and
at least one antenna for transmitting a layered modulation signal to at least one
15 receiver, the layered modulation signal comprising both the upper layer signal and the
lower layer signal interfering with each other within the frequency band such that the
upper layer signal can be demodulated directly from the layered modulation signal
and the lower layer signal can be demodulated after subtracting the upper layer signal
from the layered modulation signal;
20 wherein substantially no guard band is used within the frequency band.
10. The system of claim 9, wherein the lower layer signal includes lower layer code rate, the upper layer signal includes an upper layer code rate and the lower layer code rate is less than the upper layer code rate.
11. The system of claim 9, wherein at least one of the first excess bandwidth ratio
25 and the second excess bandwidth ratio do not exceed 0.1.

12. The system of claim 9, wherein the upper layer signal comprises a legacy signal in a satellite television system.
13. The system of claim 9, wherein the first amplifier and the second amplifier operate in a common satellite.
- 5 14. The system of claim 9, wherein the first amplifier and the second amplifier each operate in a different satellite.
15. The system of claim 9, wherein the at least one antenna comprises a common antenna for transmitting the upper layer signal and the lower layer signal.
- 10 16. The system of claim 9, wherein the at least one antenna comprises a different antenna for transmitting each of the upper layer signal and the lower layer signal.
17. The system of claim 9, further comprises a third amplifier for amplifying a third signal, the third signal having a third excess bandwidth ratio and being transmitted by the at least one antenna to occupy a majority of the frequency band of the layered modulation signal.
- 15 18. The system of claim 17, wherein the lower layer signal and the upper layer signal each do not interfere with the third signal.
19. The system of claim 17, wherein the lower layer signal interferes with the third signal.
- 20 20. The system of claim 17, wherein the first excess bandwidth ratio and the second excess bandwidth ratio each do not exceed 0.1 and the third excess bandwidth ratio does not exceed 0.2.
21. The system of claim 17, wherein at least two of the first, second and third amplifier operate in a common satellite.

22. The system of claim 17, wherein the at least one antenna comprises a common antenna for transmitting at least two of the upper layer signal, the lower layer signal and the third signal.

23. A system for transmitting signals, comprising:

- 5 means for amplifying an upper layer signal with a first excess bandwidth ratio at a first power level within a frequency band; and
- means for amplifying a lower layer signal with a second excess bandwidth ratio at a second power level within the frequency band, the second power level being exceeded by the first power level;
- 10 means for transmitting a layered modulation signal for at least one receiver means, the layered modulation signal comprising both the upper layer signal and the lower layer signal interfering with each other within the frequency band such that the upper layer signal can be demodulated directly from the layered modulation signal and the lower layer signal can be demodulated after subtracting the upper layer signal
- 15 from the layered modulation signal;
- wherein substantially no guard band is used within the frequency band.